CLASS : X

9/2012

SUBJECT : MATHEMATICS (SET-I)

Time : 3 Hrs. **M.M.: 90**

General Instructions :

1. ***All questions are compulsory.***
2. ***The question paper consists of 34 questions divided into four sections A, B, C and D. Section-A comprises of 8 questions of 1 mark each; Section-B comprises of 6 questions of 2 marks each; Section-C comprises of 10 questions of 3 marks each and Section-D comprises of 10 questions of 4 marks each.***
3. ***Question numbers 1 to 8 in Section-A are multiple choice questions where you are required to select one option out of the given four.***
4. ***There is no overall choice. However, internal choices have been provided in 1 question of two marks, 3 questions of three marks each and 2 questions of four marks each. You have to attempt only one of the alternatives in all such questions.***
5. ***Use of calculator is not permitted.***

SECTION-A

Question numbers 1 to 8 carry one mark each. For each question, four alternative choices have been provided of which only one is correct. You have to select the correct choice.

Q1. The decimal expansion of $\frac{189}{125}$ will terminate after :

(a) 1 place of decimal (b) 2 places of decimal

(c) 3 places of decimal (d) 4 places of decimal

Q2. If the sum of the zeroes of the quadratic polynomial $3x^2 - kx + 6$ is 3, then the value of k is :

(a) 9 (b) 3

(c) -3 (d) 6

Q3. If $\Delta ABC \sim \Delta PQR$, perimeter of ΔABC = 32 cm, perimeter of ΔPQR = 48 cm and PR = 6cm, then the length of AC is equal to :

(a) 9 cm (b) 4 cm

(c) 8 cm (d) 18 cm

Q4. If A, B and C are interior angles of a ΔABC, then $\tan\left(\frac{A+B}{2}\right)$ equals :

(a) $\sin\left(\frac{C}{2}\right)$ (b) $\cos\left(\frac{C}{2}\right)$

(c) $\cot\left(\frac{C}{2}\right)$ (d) $\tan\left(\frac{C}{2}\right)$

Q5. The number of zeroes that the polynomials $f(x) = (x - 2)^2 + 4$ can have is :

(a) 1 (b) 2

(c) 0 (d) 3

Q6. Two lines are given to be parallel. The equation of one of the line is $4x + 3y = 14$. The equation of the second line can be :

(a) $3x + 4y = 14$ (b) $8x + 6y = 28$

(c) $12x + 9y = 42$ (d) $-12x = 9y$

Q7. If sec2A = cosec (A - 27°) where 2A is an acute angle, then the measure of ∠A is :

(a) 35° (b) 37°

(c) 39° (d) 21°

Q8. Mode is the value of the variable which has :

(a) maximum frequency (b) minimum frequency

(c) mean frequency (d) middle most frequency

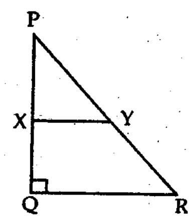
SECTION-B

Question numbers 9 to 14 carry two marks each.

Q9. Find the HCF (867, 255) using Euclid's division lemma.

Q10. Form a quadratic polynomial whose zeroes are $3+\sqrt{2}$ and $3-\sqrt{2}$

Q11. In the given figure, PQR is a triangle right angled at Q and XY ∥ QR. If PQ = 6 cm, PY = 4 cm and PX : XQ = 1:2. Calculate the lengths of PR and QR.



Q12. If $\cos(A+B) = 0$ and $\sin(A-B) = \frac{1}{2}$, then find the value of A and B where A and B are acute angles.

Q13. Find the zeroes of the polynomial $2x^2 - 9$.

Q14. Convert the following frequency distribution to a 'more than type' cumulative frequency distribution.

Marks obtained	0-20	20-40	40-60	60-80	80-100
No. of Students	5	9	12	8	6

OR

Find the mode of the following data :

Height (in cms)	0-10	10-20	20-30	30-40	40-50
No. of Students	6	10	12	32	20

SECTION-C

Question numbers 15 to 24 carry three marks each.

Q15. D, E, F are respectively the mid-points of the sides AB, BC and CA of ΔABC. Find the ratios of the areas of ΔDEF and ΔABC.

Q16. Find the zeroes of the following quadratic polynomial and verify the relationship between the zeroes and the co-efficients $p(x) = 2x^2 - 3 + 5x$.

Q17. Prove that $\sqrt{5}$ is irrational and hence show that $3+\sqrt{5}$ is also irrational.

OR

Find the HCF and LCM of 510 and 92. And verify that HCF × LCM = Product of two given numbers.

Q18. Evaluate : $\dfrac{\text{Sec } 41^\circ.\text{Sin } 49^\circ + \text{Cos } 29^\circ.\text{Cosec } 61^\circ - \frac{2}{\sqrt{3}}(\tan 20^\circ.\tan 60^\circ.\tan 70^\circ)}{3\,(\text{Sin}^2 31^\circ + \text{Sin}^2 59^\circ)}$

Q19. Check by division whether $x^2 - 2$ is a factor of $x^4 + x^3 + x^2 - 2x - 3$.

Q20. Two years ago, Ram was thrice as old as his daughter and six years later, he will be four years older than twice her age. How old are they now?

OR

Find whether the following pair of linear equations has a unique solution, if yes, find the solution.

$7x - 4y = 49$; $5x - 6y = 57$

Q21. Find the mean for the following data :

Classes	Frequencies
24.5 - 29.5	4
29.5 - 34.5	14
34.5 - 39.5	22
39.5 - 44.5	16
44.5 - 49.5	6
49.5 - 54.5	5
54.5 - 59.5	3

Q22. Prove that the sum of the squares of the sides of a rhombus is equal to the sum of the squares of its diagonals.

OR

If the diagonals of a quadrilateral divide each other proportionally, prove that it is a trapezium.

Q23. Prove that : $\frac{\sin\theta - \cos\theta}{\sin\theta + \cos\theta} + \frac{\sin\theta + \cos\theta}{\sin\theta - \cos\theta} = \frac{2}{2\sin^2\theta - 1}$

Q24. The following is the distribution of heights of students of a class in a school.

Height (in cm)	160-163	163-166	166-169	169-172	172-175
No. of Students	15	118	142	127	18

Find the median height.

SECTION-D

Question numbers 25 to 34 carry four marks each.

Q25. Show that square of any positive integer is of the form 4 m (or) 4 m + 1, where m is any integer.

Q26. Solve the following pair of linear equations graphically.

$x + 3y = 6;\ 2x - 3y = 12$

Q27. Prove that : $\frac{\text{Cosec } A}{\text{Cosec } A - 1} + \frac{\text{Cosec } A}{\text{Cosec } A + 1} = 2\,\text{Sec}^2 A$

Q28. Find the value of x and y if the median for the following data is 31.

Class	0-10	10-20	20-30	30-40	40-50	50-60	Total
Frequency	5	x	6	y	6	5	40

Q29. Divinde $p(x) = 3x^5 - 2x^4 + x^2 - 2$ by $g(x) = x^2 + x + 1$ and check the result by division algorithm.

OR

The age of the father is twice the sum of the ages of his 2 children. After 20 years, his age will be equal to the sum of the ages of his children. Find the age of the father.

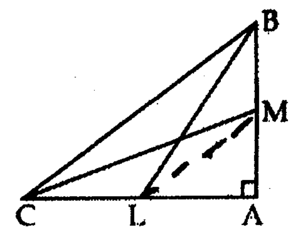
Q30. Prove that if in a triangle, the square on one side is equal to the sum of the squares of the other two sides, then the angle opposite to the first side is a right angle.

OR

Prove that the ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding sides.

Q31. Prove that : $\sqrt{\frac{\text{Sec}\theta - 1}{\text{Sec}\theta + 1}} + \sqrt{\frac{\text{Sec}\theta + 1}{\text{Sec}\theta - 1}} = 2\,\text{Cosec}\theta$

Q32. In the given figure, BL and CM are medians of a triangle ABC right angled at A prove that $4(BL^2 + CM^2) = 5BC^2$



Q33. Evaluate : $\frac{\text{Cot}(90°-\theta)\,\text{Sin}(90°-\theta)}{\text{Sin}\theta} + \frac{\text{Cot } 40°}{\text{Tan } 50°} - (\text{Cos}^2 20° + \text{Cos}^2 70°)$

Q34. Draw "less than ogive" for the following distribution

Class	Frequency
20 - 30	10
30 - 40	8
40 - 50	12
50 - 60	24
60 - 70	6
70 - 80	25
80 - 90	15